CHAPTER 1

INTRODUCTION

1.1 GENERAL INTRODUCTION

Welding is one of the types of joint that were widely used in the industry. There are many types of welding such as resistance welding, brazing, arc welding and oxyfuel gas welding. Metal Inert Gas (MIG) and Tungsten Inert Gas (TIG) welding are categorized as an arc welding. In order to have a better understanding of the effect of MIG and TIG welding in term of dynamic characteristics of the structure, modal analysis was used. Modal analysis is one of the methods that were used to study the dynamic characteristic of the structure such as natural frequency and mode shape. Other than that, Finite Element Analysis (FEA) also can be used to determine the dynamic characteristic of the structure. The study of the dynamic characteristic of the structure is important so that an incident like the Tacoma Narrows Bridge can be avoided.

1.2 PROBLEM STATEMENT

The used of hybrid structure or dissimilar metals in industrial practice is common nowadays and welding joint is one of the method that was used to join this type of structure. Automakers as an example use dissimilar metal to make a car safer, lighter and more environmentally efficient (Kinsey et al., 2001). The main problem that was faced by the welder is that the welding joint of the dissimilar welding are not strong enough due to the differences of the melting point between the two metals. Many researches were done before to produce a sound joint on the dissimilar metal. The researches that were done only concern on to produce a strong joint on the structure while neglecting the effect on their dynamic characteristic. In order to produce a safer and better structure that will be used by people, the effect welding joins to the dynamic characteristic of the structure also must be understood. This is important so that the structure is safe to be used in any application and field. This research will investigate the effect of the different type of welding on hybrid structure in term of the dynamic characteristic of the structure using modal analysis.

1.3 OBJECTIVES OF STUDY

The objective of this project is to study the dynamic characteristic of hybrid plates that are joined by MIG and TIG welding by using modal analysis and will be validated by results from FEA software.

1.4 SCOPES OF PROJECT

The scopes of the project are stated as below:

a) Selection of available metal and type of joint that will be used in the project
b) Undergo MIG and TIG welding process to join the metals.
c) Modelling the structure by using CAD software and analysis by FEA software.
d) Carry out modal analysis by impact hammer test.
e) Comparison between experimental and theoretical data.
f) Using ODS to determine the dominant mode.